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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/549,585

12/01/2005

Seiko Hirayama

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EXAMINER

JOHNSON, KEVIN M

ART UNIT

PAPER NUMBER

1793

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/549,585	<b>Applicant(s)</b> HIRAYAMA ET AL.	
	<b>Examiner</b> KEVIN M. JOHNSON	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/13/2005, 1/17/2006 and 2/11/2008</u> .                      | 6) <input type="checkbox"/> Other: _____                          |



## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statements (IDS) submitted on 9/13/2005, 1/17/2006 and 2/11/2008 are compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Morihito et al. (JP 2000-144129 A).

In regards to claim 1, Morihito teaches a phosphorescent material comprising Eu as an activator, a coactivator which may optionally be selected from a group including Nb and the host compound  $\text{MAl}_4\text{O}_7$ , where M is Mg, Ca, Sr or Ba (claim 3).

In regards to claim 4, Morihito teaches that the Nb content of the phosphor is between 0.0001 and 1 mole percent (paragraph 5).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 2, 3, and 5-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Morihito as applied to claim 1 above, and further in view of Setoguchi et al. (JP 2003-336055 A).

In regards to claim 2, Morihito fails to teach a material that has been fired in an oxidizing atmosphere after being fired in a reducing atmosphere. Setoguchi teaches a phosphor containing Ba, Mg, Al, O and Eu produced by mixing raw materials, firing the mixture in a reducing atmosphere, and then an oxidizing atmosphere is introduced for the last firing step (paragraph 70). It would have been obvious to one skilled in the art

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at the time of the invention to utilize the process taught by Setoguchi to produce the material taught by Morihito. This modification would have been motivated by the teaching of Setoguchi that an additional firing under an oxidizing atmosphere increases the performance of alkaline earth metal phosphors activated with Eu.

In regards to claim 3, the material made by utilizing the process taught by Setoguchi to produce the material disclosed by Morihito would contain Ba, Al, Mg, and Eu, in addition to Nb, Mo, Ta, W or Bi and would have undergone firing in a reducing and then oxidizing process. It would have been obvious to one skilled in the art at the time of the invention that the product obtained by such a process would be the same as a product produced by the method described in the instant claim.

In regards to claim 5, Setoguchi teaches the material  $\text{Ba}_{1-x-y}\text{Sr}_y\text{MgAl}_{10}\text{O}_{17}:\text{Eu}_x$  where  $0.03 < x < 0.25$  and  $0 < y < 0.25$  (paragraph 32). It would have been obvious to one skilled in the art at the time of the invention to add Nb, Mo, Ta, W, or Bi to the material. This modification would have been motivated by the teaching of Morihito that these additional components enhance the performance of alkaline earth metal phosphates activated with Eu.

In regards to claim 6, a powder whiteness value of at least 85 as expressed in terms of W value is considered to be inherent to the phosphor material claimed.

In regards to claims 7 and 8, Morihito teaches a process for manufacturing an alkaline earth metal phosphor activated with Eu comprising the steps:

- a. Mixing the raw materials, including an additive component
- b. Firing the mixture in a reducing atmosphere

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While Morihito does not teach the firing of the material in an oxidizing atmosphere after firing in a reducing atmosphere or the inclusion of both (Ba and/or Sr) and Mg, Setoguchi teaches the production of an alkaline earth metal aluminate phosphor comprising the steps of (paragraph 70):

- a. Mixing the raw ingredients including Ba, Sr, Mg, Al and Eu
- b. Firing the raw ingredients in a reducing atmosphere
- c. Firing the resulting material in an oxidizing atmosphere

It would have been obvious to one skilled in the art at the time of the invention to combine the processes taught by Morihito and Setoguchi. This modification would have been motivated by the teaching of Setoguchi that subjecting alkaline earth metal phosphors activated with Eu to an additional firing under oxidizing conditions improves the performance of the material, and the teaching of Morihito that an additive element in alkaline earth metal phosphors results in improved performance.

In regards to claim 9, Setoguchi teaches that prior to firing the material in a reducing atmosphere it is fired in air. It would have been obvious to one skilled in the art at the time of the invention that ambient air constitutes an oxidizing environment.

In regards to claim 10, Morihito teaches that after adding the additional element (Nb, Mo, Ta, etc.) to the mixture of the other precursor materials the mixture is fired in a reducing atmosphere. Setoguchi teaches a method that includes the additional firing of the material in air before the reducing atmosphere and firing in an oxidizing atmosphere after the reducing atmosphere. It would have been obvious to one skilled in the art at the time of the invention to alter the time of addition of the additive element as taught by

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Morihito to take place after an initial firing of the rest of the raw ingredients, but before firing in the reducing atmosphere, resulting in the same product. It is well established that the rearrangement of the order of steps in a process constitutes a case of *prima facie* obviousness in the absence of unexpected results (see MPEP 2144.04).

In regards to claim 11, Morihito teaches that Nb, Mo, Ta, W and Bi are common additives to alkaline earth metal phosphors, and it would be therefore be obvious to include at least one of them in the fired product (abstract). It would further be obvious from the suggestion of Morihito that multiple additives may be selected from the list that an additional element could be added after the initial firing of the material to enhance the improvement of the material.

In regards to claim 12, Morihito teaches that after adding the additive element(s) the mixture is fired in a reducing atmosphere, and therefore it would be obvious to one skilled in the art to fire the mixture in a reducing atmosphere after the additive elements have been added.

In regards to claim 13, it would be obvious to one skilled in the art that the material taught by Setoguchi could be fired in a reducing atmosphere before the addition of the additive element taught by Morihito. This combination would result in a process comprising the steps of:

- a. Mixing the raw ingredients including Ba, Sr, Mg, Al and Eu
- b. Firing the raw ingredients in a reducing atmosphere
- c. Adding the additive component to the fired material
- d. Firing the mixture in a reducing atmosphere



- e. Firing the resulting material in an oxidizing atmosphere

Such a modification would be motivated by the teaching of Morihito that the mixture is fired in a reducing atmosphere after the additive component is included, and the teaching of Setoguchi that the phosphor precursor mixture is fired in a reducing atmosphere before being fired in an oxidizing atmosphere.

### ***Conclusion***

No claims are allowed. All claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 7:30 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KMJ

/Jerry A Lorengo/

Supervisory Patent Examiner, Art Unit 1793